

**Amendment and Response under 37 C.F.R. 1.116**

Applicant: Daniel R. Marshall

Serial No.: 09/893,246

Filed: June 26, 2001

Docket No.: 10002308-1 (H303.192.101)

Title: ULTRA-HIGH DENSITY STORAGE DEVICE WITH ELECTRON BEAM STEERING**IN THE CLAIMS**

Please amend claims 1 and 11 as follows:

**This listing of claims will replace all prior versions, and listings, of the claims:**

- 1.(Currently Amended)      A storage device comprising:
- a field emitter for generating an electron beam current;
  - a storage medium in close proximity to the field emitter, the storage medium having a plurality of storage areas for storage of information, each of the plurality of storage areas being in one of a plurality of states to represent the information stored in that storage area;
- such that:
- an effect is generated when the electron beam current bombards one of the storage areas;
  - the magnitude of the effect depends on the state of the bombarded storage area; and
  - the information stored in the bombarded storage area is read by measuring the magnitude of the effect; and
- an electron beam steering mechanism for deflecting the electron beam current in two substantially perpendicular directions to different ones of the storage areas.
- 2.(Original)      The storage device of claim 1, wherein the electron beam steering mechanism comprises:
- a first set of electrodes for deflecting the electron beam current in a first direction; and
  - a second set of electrodes for deflecting the electron beam current in a second direction substantially perpendicular to the first direction.
- 3.(Original)      The storage device of claim 1, and further comprising:
- a micromover for causing a change in the relative positions between the field emitter and the storage medium.

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4.(Original) The storage device of claim 3, wherein the micromover is configured to cause movement of the field emitter.

5.(Original) The storage device of claim 3, wherein the micromover is configured to cause movement of the storage medium.

6.(Original) The storage device of either claim 1 or 3, wherein the electron beam current traces out a periodic trajectory on the storage medium.

7.(Original) The storage device of claim 6, wherein the shape of the periodic trajectory is one of a circle, ellipse, spiral, square, rectangle and figure 8.

8.(Original) The storage device of claim 6, wherein the shape of the periodic trajectory is one of a triangle wave shape, a sawtooth wave shape, a Lissajous wave shape, a rectangle wave shape, and a sinusoidal wave shape.

9.(Original) The storage device of claim 1, wherein at least a portion of the information stored in the storage areas is stored and read based on pulse width modulation (PWM).

10.(Original) The storage device of claim 1, and further comprising:

a plurality of field emitters, each being similar to the field emitter recited in claim 1, such that the plurality of field emitters work in parallel to read information from the device; and

a plurality of electron beam steering mechanisms for deflecting the electron beam currents from the plurality of field emitters to different ones of the storage areas.

11.(Currently Amended) A method of accessing information from a storage medium, the storage medium including a plurality of storage areas for storing information, each storage area being in one of a plurality of states to represent the information stored in that storage area, the method comprising:

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generating an electron beam current with a field emitter, the electron beam current directed toward a first one of the storage areas on the storage medium; detecting an effect in the first one of the storage areas caused by the electron beam current, the effect based on the state of the storage area; and steering the electron beam current in two dimensions to multiple ones of the storage areas.

12.(Original) The method of claim 11, wherein steering the electron beam current comprises:

deflecting the electron beam current in a first direction with a first deflection mechanism; and  
deflecting the electron beam current in a second direction substantially perpendicular to the first direction with a second deflection mechanism.

13.(Original) The method of claim 11, and further comprising:

generating a change in the relative positions between the field emitter and the storage medium.

14.(Original) The method of claim 13, wherein the generating a change step includes moving the field emitter.

15.(Original) The method of claim 13, wherein the generating a change step includes moving the storage medium.

16.(Original) The method of either claim 11 or 13, wherein the electron beam current traces out a periodic trajectory on the storage medium.

17.(Original) The method of claim 11, wherein at least a portion of the information stored in the storage areas is stored using pulse width modulation (PWM).

18.(Original) The method of claim 11, and further comprising:

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generating a plurality of electron beam currents with a plurality of field emitters;  
steering each electron beam current toward one of the plurality of storage areas on the  
storage medium; and  
detecting an effect in each of the storage areas caused by the electron beam current  
directed at that storage area, the effects based on the state of the storage areas.

**19.(Original) A storage device comprising:**

a field emitter for generating an electron beam current;  
a storage medium in close proximity to the field emitter, the storage medium having a  
plurality of storage areas for storage of information, each of the plurality of  
storage areas being in one of a plurality of states to represent the information  
stored in that storage area, the information stored in a storage area being read  
by bombarding the storage area with the electron beam current and measuring  
an effect generated by the bombardment; and  
a beam deflector for deflecting the electron beam current in two substantially  
orthogonal directions.

**20.(Original) The storage device of claim 19, and further comprising:**

a plurality of field emitters, each being similar to the field emitter recited in claim 19,  
such that the plurality of field emitters work in parallel to read information  
from the device; and  
a plurality of beam deflectors for deflecting the electron beam currents from the  
plurality of field emitters in two substantially orthogonal directions.